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Applicant: KRISTIINA YLIHONKO ET AL.

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AND ITS USE FOR GENETIC ENGINEERING

STATEMENT UNDER 37 C.F.R. §1.821(f)

Commissioner for Patents
Washington, DC 20231

Sir:

The undersigned hereby states that the contents of the paper copy of the sequence listing in the accompanying patent application and the accompanying computer readable copy of the sequence listing are the same.

Respectfully submitted,



Herbert I. Cantor

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May 2, 2001

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SEQUENCE LISTING

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<120> THE GENE CLUSTER INVOLVED IN ACLACINOMYCIN BIOSYNTHESIS, AND ITS USE
FOR GENETIC ENGINEERING

<130> 1574/49884

<150> PCT/FI00/00819

<151> 2000-09-25

<160> 16

<170> PatentIn version 3.0

<210> 1

<211> 662

<212> PRT

<213> Streptomyces galilaeus

<400> 1

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35 40 45Arg Leu Leu Asp Ala Gly Leu Leu Cys Ala Tyr Pro Gln Asp Gly Ala
50 55 60Asp Arg Pro Glu Arg Ala Tyr Arg Ser Leu Thr Gly Leu Gln Ala Arg
65 70 75 80

Ser Ala Asp Ala Arg Asp Ala Val Leu Ala Ala Val Asp Leu Thr Gly
 85 90 95
 Asp Ala Glu Ser Pro Leu Pro Glu Ala Val Ser Ala Ala Gly Leu Arg
 100 105 110
 Ala Ala Ala Pro Gly Glu His Ala Ala Leu Thr Leu Val Leu Cys His
 115 120 125
 Asp Tyr Leu Asp Pro Arg Leu Ser Ala Leu Asp Ala Glu His Arg Ala
 130 135 140
 Thr Gly Arg Gly Trp Leu Pro Val Arg Ala Asn Gly Thr His Leu Trp
 145 150 155 160
 Ile Gly Pro Phe Phe Ser Ala Gly Asp Gly Pro Cys Trp Ser Cys Leu
 165 170 175
 Ala Asp Arg Leu Arg Leu Arg Arg Arg Gly Glu Ala Tyr Val Gln His
 180 185 190
 Arg Leu Gly His Ser Gly Pro Ala Val His Arg Arg Ala Tyr Leu Pro
 195 200 205
 Ala Gly Arg Ala Ala Ala Leu Gln Leu Ala Leu Leu Glu Ala Gly Lys
 210 215 220
 Trp Leu Ser Gly His Arg Asp Thr Val Gln Asp Ser Leu Trp Arg Leu
 225 230 235 240
 Asp Thr Arg Thr Leu Glu Ser Ser Arg His Pro Val Arg Arg Arg Pro
 245 250 255
 Gln Cys Ser Arg Cys Gly Asp Pro Leu Leu Val Arg Asp Arg Val Ser
 260 265 270
 Ala Pro Val Val Leu Ser Ser Arg Pro Val Arg Asp Glu Ser Gly Gly
 275 280 285
 Gly His Arg Thr Phe Gly Pro Gln Glu Met Leu Asp Arg Tyr Gly His
 290 295 300
 Leu Val Asp Pro Val Thr Gly Val Val Gly Glu Ile Arg Arg Asp Pro
 305 310 315 320
 Arg Gly Pro Glu Phe Leu Asn Cys Phe Thr Arg Ser Arg Cys Arg Leu
 325 330 335
 Gly Pro Arg Ala Ala Pro Pro Ala Leu His Ser Pro Leu Arg Ser Pro
 340 345 350
 Gly Ser Gly Lys Gly Val Thr Glu Leu His Ala Arg Val Ser Ala Leu
 355 360 365
 Ala Glu Ala Leu Glu Arg Cys Ser Gly Tyr Phe Gln Gly Asp Glu Pro
 370 375 380
 Arg Arg Arg Gly Ser Tyr Arg Glu Leu Ala Gly Leu Ala Val His Pro
 385 390 395 400
 Asp Ser Val Gln Leu Phe Asp Arg Arg Gln Phe Glu Asp Arg Arg Ala
 405 410 415

Trp Asn Arg Ala His Gly Pro Phe His Gln Val Thr Glu Pro Phe Asp
 420 425 430
 Glu Asp Ala Pro Ile Asp Trp Thr Pro Val Trp Ser Leu Thr Glu Arg
 435 440 445
 Arg Gln Arg Leu Ala Pro Thr Ser Leu Leu Tyr Tyr Asn Ala Pro Asp
 450 455 460
 Ala Asp Thr Gly Phe Cys Arg Ala Thr Ser Asn Gly Ala Ala Ala Gly
 465 470 475 480
 Thr Ser Leu Glu Asp Ala Val Val His Gly Cys Leu Glu Leu Val Glu
 485 490 495
 Arg Asp Ala Ile Ala Leu Trp Trp Tyr Asn Arg Thr Arg Gln Pro Gly
 500 505 510
 Val Thr Leu Asp Ala Arg Asp Pro Trp Ile Thr Arg Leu Arg Ala Val
 515 520 525
 Leu Arg Asp Leu Gly Arg Thr Val Trp Ala Leu Asp Leu Thr Ser Asp
 530 535 540
 Leu Gly Ile Pro Val Val Ala Ala Val Ser Val Arg Thr Gly Gly Thr
 545 550 555 560
 Ala Glu Asp Ile Val Leu Gly Phe Gly Ala His Phe Asp Pro Arg Ile
 565 570 575
 Ala Leu Arg Arg Ala Leu Thr Glu Leu Ser Gln Met Leu Pro Pro Leu
 580 585 590
 Ala Gln Glu Thr Ala Gly Asp Ala Ser Ala Tyr Thr Gly Thr Asp Pro
 595 600 605
 Glu Ala Met Arg Trp Phe Arg His Ala Thr Thr Ala Asn Gln Pro Tyr
 610 615 620
 Leu Leu Pro Ala Ala Arg Arg Ser Ala Arg Pro Pro Ala Ser Leu Arg
 625 630 635 640
 Pro Pro Arg Asp Ala Ala Ala Gln Ala Gly Ala Leu Val Ala Leu Leu
 645 650 655
 Arg Arg His Gly Leu Glu
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<210> 2

<211> 272

<212> PRT

<213> Streptomyces galilaeus

<400> 2

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Ser Ile Val Pro Thr Ala Ala Lys Pro Arg Gln Ile Leu Ala Leu Leu
 20 25 30
 Ala Ile His Ala Asn Arg Val Leu Pro Val Gly Thr Leu Met Glu Glu
 35 40 45
 Ile Trp Gly Thr Glu Pro Pro Gln Ser Ala Leu Ala Thr Leu His Thr
 50 55 60
 Tyr Ile Leu Gln Leu Arg Arg Arg Leu Thr Ala Ala Tyr Gly Asp Glu
 65 70 75 80
 Gly Gly Val Ser Ala Lys Asp Val Leu Val Thr Gln Tyr Gly Gly Tyr
 85 90 95
 Cys Trp Gln Ala Pro Thr Asp Ser Val Asp Val Pro Arg Tyr Glu Arg
 100 105 110
 Leu Val Thr Ala Gly Arg Ile Ala Thr Ala Glu Asp Arg Gln Glu Glu
 115 120 125
 Ala Ser Ala His Phe Arg Glu Ala Leu Ala Leu Trp Arg Gly Ser Ala
 130 135 140
 Leu Val Asp Val Arg Ile Gly Pro Val Leu Ser Ile Glu Val Ala Arg
 145 150 155 160
 Leu Glu Glu Ser Arg Leu Gly Val Leu Glu Arg Cys Leu Glu Ala Asp
 165 170 175
 Leu Arg Leu Gly Arg His Ala Glu Leu Leu Ala Glu Leu Thr Glu Leu
 180 185 190
 Thr Gly Arg His Pro Leu His Glu Gly Leu His Ala Gln Cys Met Thr
 195 200 205
 Ala Leu Tyr Arg Ala Gly Arg Ser Trp Gln Ala Leu Asp Val Tyr Gln
 210 215 220
 Arg Leu Arg Arg Arg Leu Ala Glu Glu Leu Gly Leu Ser Pro Ser Pro
 225 230 235 240
 Arg Leu Gln Arg Leu Gln Gln Ala Val Leu Ser Ala Glu Pro Trp Leu
 245 250 255
 Asp Ala Pro Arg Tyr Gly Gly Asp Pro Val Phe Asp Arg Met Ile Ser
 260 265 270

<210> 3

<211> 434

<212> PRT

<213> Streptomyces galilaeus

<400> 3

Met Thr Ser Asp Thr Lys Ala Leu Val Leu Glu Gln Val Arg Glu Tyr
 1 5 10 15

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			20					25					30			
Leu	Ser	Ser	Gly	Ala	Val	Leu	Asp	Glu	Glu	Asp	Arg	Val	Ala	Leu	Val	
		35					40					45				
Glu	Ala	Ala	Leu	Asp	Leu	Arg	Ile	Ala	Ala	Gly	Ala	His	Ser	Arg	Arg	
	50					55					60					
Phe	Glu	Ser	Lys	Phe	Ala	Arg	His	Ile	Gly	Val	Arg	Lys	Ala	His	Leu	
65					70					75					80	
Val	Asn	Ser	Gly	Ser	Ser	Ala	Asn	Leu	Leu	Ala	Leu	Ser	Ala	Leu	Thr	
				85					90					95		
Ser	Pro	Arg	Leu	Gly	Glu	Gln	Arg	Leu	Arg	Pro	Gly	Asp	Glu	Val	Ile	
			100					105					110			
Thr	Val	Ala	Gly	Gly	Phe	Pro	Thr	Thr	Val	Asn	Pro	Ile	Leu	Gln	Asn	
		115					120					125				
Gly	Leu	Thr	Pro	Val	Phe	Val	Asp	Leu	Glu	Leu	Gly	Thr	Tyr	Asn	Thr	
	130					135					140					
Thr	Val	Glu	His	Val	Arg	Ala	Ala	Ile	Ser	Asp	Arg	Thr	Arg	Ala	Ile	
145					150					155					160	
Met	Ile	Ala	His	Thr	Leu	Gly	Asn	Pro	Tyr	Gln	Val	Ala	Glu	Ile	Gln	
				165					170					175		
Gln	Leu	Ala	Thr	Glu	His	Glu	Leu	Phe	Leu	Ile	Glu	Asp	Asn	Cys	Asp	
			180					185					190			
Ala	Val	Gly	Ser	Thr	Tyr	Gln	Gly	Arg	Met	Thr	Gly	Thr	Phe	Gly	Asp	
		195					200					205				
Leu	Ala	Thr	Val	Ser	Phe	Tyr	Pro	Ala	His	His	Ile	Thr	Thr	Gly	Glu	
	210					215					220					
Gly	Gly	Cys	Val	Leu	Thr	Arg	Asn	Leu	Glu	Leu	Ala	Arg	Ile	Val	Glu	
225					230					235					240	
Ser	Phe	Arg	Asp	Trp	Gly	Arg	Asp	Cys	Trp	Cys	Glu	Pro	Gly	Glu	Asp	
				245					250					255		
Asn	Thr	Cys	Leu	Lys	Arg	Phe	Asp	Tyr	Gln	Leu	Gly	Asn	Leu	Pro	Lys	
			260					265					270			
Gly	Tyr	Asp	His	Lys	Tyr	Ile	Phe	Ser	His	Ile	Gly	Tyr	Asn	Leu	Lys	
		275					280					285				
Ala	Thr	Asp	Leu	Gln	Gly	Ala	Leu	Ala	Leu	Ser	Gln	Leu	Asn	Lys	Leu	
	290					295					300					
Pro	Glu	Phe	Gly	Ala	Ala	Arg	Arg	Arg	Asn	Trp	Gln	Arg	Leu	Arg	Asp	
305					310					315					320	
Gly	Leu	Ala	Asp	Val	Pro	Gly	Leu	Leu	Leu	Pro	Val	Ala	Thr	Pro	Gly	
				325					330					335		
Ser	Asp	Pro	Ser	Trp	Phe	Gly	Phe	Val	Ile	Thr	Val	Leu	Pro	Asp	Ala	
			340					345					350			

Thr Tyr Thr Arg Arg Asp Leu Val Ala Phe Leu Glu Glu Arg Arg Ile
 355 360 365
 Gly Thr Arg Arg Leu Phe Gly Gly Asn Leu Thr Arg His Pro Ala Tyr
 370 375 380
 Leu Gly Thr Pro His Arg Val Ala Gly Asp Leu Arg Asn Ser Asp Ile
 385 390 395 400
 Ile Thr Glu Gln Ser Phe Trp Ile Gly Val Tyr Pro Gly Ile Thr Glu
 405 410 415
 Glu Met Thr Asp Tyr Met Arg Glu Ser Ile Val Glu Phe Val Thr Lys
 420 425 430
 Asn Gly

<210> 4

<211> 329

<212> PRT

<213> Streptomyces galilaeus

<400> 4

Met Pro Lys Asp Thr Pro Arg Pro Val Leu Arg Ile Gly Val Leu Gly
 1 5 10 15
 Cys Ala Asp Ile Ala Val Arg Arg Ile Leu Pro Ala Ile Val Glu His
 20 25 30
 Pro Ser Val Arg Leu Val Ala Leu Ala Ser Arg Asp Gly Ala Arg Ala
 35 40 45
 Glu Arg Leu Ala Ala Arg Phe Gly Cys Ala Ala Val Thr Gly Tyr Lys
 50 55 60
 Ala Leu Leu Asp Arg Glu Asp Ile Asn Ala Val Tyr Val Pro Leu Pro
 65 70 75 80
 Pro Gly Met His His Glu Trp Val Thr Glu Ala Leu Thr Ala Gly Lys
 85 90 95
 His Val Leu Val Glu Lys Pro Leu Ser Thr Thr Tyr Ala Gln Ser Val
 100 105 110
 Asp Leu Val Ala Met Ala Gly Arg Leu Gly Leu Ala Leu Thr Glu Asn
 115 120 125
 Phe Met Phe Leu His His Ser Gln His Glu Ala Val Arg Ala Met Thr
 130 135 140
 Gly Glu Ile Gly Glu Leu Arg Val Phe Thr Ser Ser Phe Gly Val Pro
 145 150 155 160
 Pro Pro His Pro Ser Ser Phe Arg His Asp Ala Arg Leu Gly Gly Gly
 165 170 175

Ala	Leu	Leu	Asp	Val	Gly	Val	Tyr	Pro	Leu	Arg	Ala	Ala	Gln	Leu	His
			180					185					190		
Leu	Ala	Gly	Glu	Leu	Asp	Val	Leu	Gly	Ala	Cys	Leu	Arg	Val	Asp	Glu
		195					200					205			
Ala	Thr	Gly	Val	Asp	Val	Ala	Gly	Ser	Ala	Leu	Leu	Ser	Thr	Ala	Thr
	210					215					220				
Gly	Val	Thr	Ala	Gln	Leu	Asp	Phe	Gly	Phe	Gln	His	Ala	Tyr	Arg	Ser
225					230					235					240
Val	Tyr	Ala	Leu	Trp	Gly	Ser	Arg	Gly	Arg	Leu	Ser	Val	Pro	Arg	Ala
			245					250					255		
Phe	Thr	Pro	Pro	Arg	Glu	His	Arg	Pro	Val	Val	Arg	Ile	Glu	Gln	Gln
			260					265					270		
Asp	Arg	Leu	Thr	Glu	Val	Thr	Leu	Pro	Ala	Asp	His	Gln	Val	Gly	Asn
		275					280					285			
Ala	Leu	Asp	Ala	Phe	Ala	Ser	Ala	Val	His	Ser	Glu	Thr	Val	Arg	Ala
	290					295					300				
Ser	Leu	Gly	Glu	Ala	Leu	Leu	Arg	Gln	Ala	Leu	Leu	Val	Glu	Gln	Val
305					310					315					320
Arg	Lys	Ala	Ala	Arg	Val	Val	Ser	Gly							
				325											

<210> 5

<211> 323

<212> PRT

<213> Streptomyces galilaeus

<400> 5

Met	Arg	Val	Leu	Ile	Thr	Gly	Gly	Ala	Gly	Phe	Ile	Gly	Ser	His	Tyr
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Val	Arg	Ser	Leu	Leu	Ala	Gly	Thr	Leu	Pro	Gly	Pro	Arg	Pro	Ser	Arg
			20					25					30		
Val	Thr	Val	Val	Asp	Leu	Leu	Thr	Tyr	Ala	Gly	Asp	Thr	Gly	Asn	Leu
		35					40					45			
Pro	Leu	Ala	Asp	Pro	Arg	Leu	Asp	Phe	Arg	Arg	Leu	Asp	Ile	Arg	Asp
	50					55					60				
Leu	Asp	Ala	Leu	Leu	Thr	Val	Val	Pro	Gly	His	Asp	Ala	Val	Val	His
65					70					75					80
Phe	Ala	Ala	Glu	Thr	His	Val	Asp	Arg	Ser	Leu	Ser	Glu	Pro	Ala	Glu
			85						90					95	
Phe	Val	Arg	Thr	Asn	Val	Leu	Gly	Thr	Gln	Ser	Leu	Leu	Glu	Ala	Ser
			100					105					110		

Leu Arg Gly Gly Val Gly Thr Phe Val His Val Ser Thr Asp Glu Val
 115 120 125
 Tyr Gly Ser Ile Ala Gln Gly Thr Trp Thr Glu Glu Ala Pro Leu Leu
 130 135 140
 Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu Val Ala
 145 150 155 160
 Arg Ser Tyr Trp Arg Thr His Gly Leu Asp Val Arg Thr Thr Arg Cys
 165 170 175
 Ala Asn Asn Tyr Gly Pro Arg Gln His Pro Glu Lys Leu Ile Pro Leu
 180 185 190
 Phe Val Thr Glu Leu Leu Ala Gly Arg Pro Val Pro Leu Tyr Gly Asp
 195 200 205
 Gly Gly Asn Val Arg Glu Trp Leu His Val Asp Asp His Cys Arg Ala
 210 215 220
 Val His Ala Val Leu Thr Gly Gly Arg Pro Gly Glu Ile Tyr Asn Ile
 225 230 235 240
 Gly Gly Gly Thr His Leu Thr Asn Arg Glu Met Thr Ala Lys Leu Leu
 245 250 255
 Ala Leu Cys Gly Thr Asp Trp Ser Arg Val Arg Gln Val Pro Asp Arg
 260 265 270
 Lys Gly His Asp Leu Arg Tyr Ala Val Asp Asp Thr Lys Ile Arg Glu
 275 280 285
 Glu Leu Gly Tyr Arg Pro Leu Arg Ser Leu Asp Asp Gly Leu Arg Glu
 290 295 300
 Val Val Asp Trp Tyr Arg Asp Arg Gln Thr His Arg Pro Glu Pro Ala
 305 310 315 320
 Glu Arg Val

<210> 6

<211> 443

<212> PRT

<213> Streptomyces galilaeus

<400> 6

Met Arg Val Leu Leu Thr Ser Phe Ala Leu Asp Ala His Phe Asn Gly
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 Ser Val Pro Leu Ala Trp Ala Leu Arg Ala Ala Gly His Glu Val Arg
 20 25 30
 Val Ala Ser Gln Pro Ala Leu Thr Ala Ser Ile Thr Ala Ala Gly Leu
 35 40 45

Thr	Ala	Val	Pro	Val	Gly	Ala	Asp	Pro	Arg	Leu	Asp	Glu	Met	Val	Lys	50	55	60	
Gly	Val	Gly	Asp	Ala	Val	Leu	Ser	His	His	Ala	Asp	Gln	Ser	Leu	Asp	65	70	75	80
Ala	Asp	Thr	Pro	Gly	Gln	Leu	Thr	Pro	Ala	Phe	Leu	Gln	Gly	Trp	Asp	85	90	95	
Thr	Met	Met	Thr	Ala	Thr	Phe	Tyr	Thr	Leu	Ile	Asn	Asp	Asp	Pro	Met	100	105	110	
Val	Asp	Asp	Leu	Val	Ala	Phe	Ala	Arg	Gly	Trp	Glu	Pro	Asp	Leu	Ile	115	120	125	
Leu	Trp	Glu	Pro	Phe	Thr	Phe	Ala	Gly	Ala	Val	Ala	Ala	Lys	Val	Thr	130	135	140	
Gly	Ala	Ala	His	Ala	Arg	Leu	Leu	Ser	Phe	Pro	Asp	Leu	Phe	Met	Ser	145	150	155	160
Met	Arg	Arg	Ala	Tyr	Leu	Ala	Gln	Leu	Gly	Ala	Ala	Pro	Ala	Gly	Pro	165	170	175	
Ala	Gly	Gly	Asn	Gly	Thr	Thr	His	Pro	Asp	Asp	Ser	Leu	Gly	Gln	Trp	180	185	190	
Leu	Glu	Trp	Thr	Leu	Gly	Arg	Tyr	Gly	Val	Pro	Phe	Asp	Glu	Glu	Ala	195	200	205	
Val	Thr	Gly	Gln	Trp	Ser	Val	Asp	Gln	Val	Pro	Arg	Ser	Phe	Arg	Pro	210	215	220	
Pro	Ser	Asp	Arg	Pro	Val	Val	Gly	Met	Arg	Tyr	Val	Pro	Tyr	Asn	Gly	225	230	235	240
Pro	Gly	Pro	Ala	Val	Val	Pro	Asp	Trp	Leu	Arg	Val	Pro	Pro	Thr	Arg	245	250	255	
Pro	Arg	Val	Cys	Val	Thr	Leu	Gly	Met	Thr	Ala	Arg	Thr	Ser	Glu	Phe	260	265	270	
Pro	Asn	Ala	Val	Pro	Val	Asp	Leu	Val	Leu	Lys	Ala	Val	Glu	Gly	Leu	275	280	285	
Asp	Ile	Glu	Val	Val	Ala	Thr	Leu	Asp	Ala	Glu	Glu	Arg	Ala	Leu	Leu	290	295	300	
Thr	His	Val	Pro	Asp	Asn	Val	Arg	Leu	Val	Asp	His	Val	Pro	Leu	His	305	310	315	320
Ala	Leu	Leu	Pro	Thr	Cys	Ala	Ala	Ile	Val	His	His	Gly	Gly	Ala	Gly	325	330	335	
Thr	Trp	Ser	Thr	Ala	Leu	Val	Glu	Gly	Val	Pro	Gln	Ile	Ala	Met	Gly	340	345	350	
Trp	Ile	Trp	Asp	Ala	Ile	Asp	Arg	Ala	Gln	Arg	Gln	Gln	Ala	Leu	Gly	355	360	365	
Ala	Gly	Leu	His	Leu	Pro	Ser	His	Glu	Val	Thr	Val	Glu	Gly	Leu	Arg	370	375	380	

Gly Arg Leu Val Arg Leu Leu Asp Glu Pro Ser Phe Thr Ala Ala Ala
 385 390 395 400
 Ala Arg Leu Arg Ala Glu Ala Glu Ser Glu Pro Thr Pro Ala Gln Val
 405 410 415
 Val Pro Val Leu Glu Arg Leu Thr Ala Gln His Arg Ala Arg Glu Pro
 420 425 430
 Arg Arg Pro Gly Gly Thr Ser Pro Cys Val Ser
 435 440

<210> 7

<211> 443

<212> PRT

<213> Streptomyces galilaeus

<400> 7

Val Gln Thr Gln Asn Ala Pro Glu Thr Ala Glu Asn Gln Gln Thr Asp
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 Ser Glu Leu Gly Arg His Leu Leu Thr Ala Arg Gly Phe His Trp Ile
 20 25 30
 Tyr Gly Thr Ser Gly Asp Pro Tyr Ala Leu Thr Leu Arg Ala Glu Ser
 35 40 45
 Asp Asp Pro Ala Leu Leu Thr Arg Arg Ile Arg Glu Ala Gly Thr Pro
 50 55 60
 Leu Trp Gln Ser Thr Thr Gly Ala Trp Val Thr Gly Arg His Gly Val
 65 70 75 80
 Ala Ala Glu Ala Leu Ala Asp Pro Arg Leu Ala Leu Arg His Ala Asp
 85 90 95
 Leu Pro Gly Pro Gln Arg His Val Phe Ser Asp Ala Trp Ser Asn Pro
 100 105 110
 Gln Leu Cys His Ile Ile Pro Leu Asp Arg Ala Phe Leu His Ala Ser
 115 120 125
 Asp Ala Asp His Thr Arg Trp Ala Arg Ser Ala Ser Ala Val Leu Gly
 130 135 140
 Ser Ala Gly Gly Ala Pro Ala Glu Gly Val Arg Glu His Ala Gly Arg
 145 150 155 160
 Val His Arg Glu Ala Ala Asp Arg Thr Gly Asp Ser Phe Asp Leu Met
 165 170 175
 Ala Asp Tyr Ser Arg Pro Val Ala Thr Glu Ala Ala Ala Glu Leu Leu
 180 185 190
 Gly Val Pro Ala Ala Gln Arg Glu Arg Phe Ala Ala Thr Cys Leu Ala
 195 200 205

Leu Gly Val Ala Leu Asp Ala Ala Leu Cys Pro Gln Pro Leu Ala Val
 210 215 220
 Thr Arg Arg Leu Thr Glu Ala Val Glu Asp Val Arg Ala Leu Val Gly
 225 230 235 240
 Asp Leu Val Glu Ala Arg Arg Thr Gln Pro Gly Asp Asp Leu Leu Ser
 245 250 255
 Ala Val Leu His Ala Gly Ser Ser Ala Ala Ser Ala Gly Gln Asp Ala
 260 265 270
 Leu Ala Val Gly Val Leu Thr Ala Val Val Gly Val Glu Val Thr Ala
 275 280 285
 Gly Leu Ile Asn Asn Thr Leu Glu Ser Leu Leu Thr Arg Pro Val Gln
 290 295 300
 Trp Ala Arg Leu Gly Glu Asn Pro Glu Leu Ala Ala Gly Ala Val Glu
 305 310 315 320
 Glu Ala Leu Arg Phe Ala Pro Pro Val Arg Leu Glu Ser Arg Ile Ala
 325 330 335
 Ala Glu Asp Leu Thr Leu Gly Gly Gln Asp Leu Pro Ala Gly Ala Gln
 340 345 350
 Val Val Val His Val Gly Ala Ala Asn Arg Asp Pro Glu Ala Phe Leu
 355 360 365
 Ala Pro Asp His Phe Asp Leu Asp Arg Pro Ala Gly Gln Gly Gln Leu
 370 375 380
 Ser Leu Ser Gly Pro His Thr Ala Leu Phe Gly Ala Phe Ala Arg Leu
 385 390 395 400
 Gln Ala Glu Thr Ala Val Arg Thr Leu Arg Glu Arg Arg Pro Val Leu
 405 410 415
 Ala Pro Ala Gly Ala Val Leu Arg Arg Met Arg Ser Pro Val Leu Gly
 420 425 430
 Ala Val Leu Arg Phe Pro Leu Thr Thr Ser Ala
 435 440

<210> 8

<211> 267

<212> PRT

<213> Streptomyces galilaeus

<400> 8

Val Asn Arg Ala Ala Arg Pro Thr Val Arg Gly Met Ser Ala Ile Ala
 1 5 10 15
 Glu Pro Thr Ala Pro Arg Gly Val Ile Val Thr Gly Gly Gly Thr Gly
 20 25 30

Ile Gly Arg Ala Thr Ala His Ala Phe Ala Asp Arg Gly Asp Arg Val
 35 40 45
 Leu Val Val Gly Arg Thr Ala Ala Thr Leu Ala Gly Thr Ala Glu Gly
 50 55 60
 His Pro Gly Ile Ser Val Leu Thr Ala Asp Leu Thr Asp Pro Asp Gly
 65 70 75 80
 Pro Arg Ala Ile Thr Asp Ala Ala Leu Asp Ala Leu Gly Arg Ile Asp
 85 90 95
 Val Leu Val Asn Asn Ala Ala Thr Gly Gly Phe Ala Gly Leu Ala Glu
 100 105 110
 Thr Glu Pro Glu Ala Ala Arg Glu Gln Phe Asp Ser Asn Leu Leu Ala
 115 120 125
 Pro Leu Leu Leu Thr Arg Gln Thr Leu Asp Ala Leu Ser Ala Asp Gly
 130 135 140
 Gly Gly Thr Val Leu Asn Ile Gly Ser Ala Gly Ala Leu Gly Arg Arg
 145 150 155 160
 Ala Trp Pro Gln Asn Gly Val Tyr Gly Ala Ala Lys Ala Gly Leu Asp
 165 170 175
 Phe Leu Thr Arg Thr Trp Ala Val Glu Leu Ala Pro Arg Gly Ile Arg
 180 185 190
 Val Leu Gly Leu Ala Pro Gly Val Ile Asp Thr Gly Ile Gly Glu Arg
 195 200 205
 Ser Gly Met Ser Arg Glu Ala Tyr Ala Gly Phe Leu Gly Gln Ile Ala
 210 215 220
 Ala Arg Val Pro Ala Gly Arg Val Gly Arg Pro Glu Asp Ile Ala Trp
 225 230 235 240
 Trp Ala Val Gln Leu Ala Asp Pro Arg Ala Ala Tyr Ala Thr Gly Ala
 245 250 255
 Val Leu Ala Val Asp Gly Gly Leu Ser Leu Thr
 260 265

<210> 9

<211> 144

<212> PRT

<213> Streptomyces galilaeus

<400> 9

Met Thr Ala Gln Ala Pro Thr Ala Pro Ala Asp Val Tyr Ala Glu Val
 1 5 10 15
 Gln His Phe Tyr Ala Arg Gln Met Arg Tyr Leu Asp Ser Gly Glu Ala
 20 25 30

Glu Thr Trp Ala Gly Thr Phe Thr Glu Asp Gly Ser Phe Ala Pro Pro
 35 40 45
 Ser Leu Pro Glu Pro Val Arg Gly Arg Pro Leu Leu Ala Glu Gly Ala
 50 55 60
 Arg Asn Ala Ala Ala Gly Leu Ala Ala Ala Arg Glu Thr His Arg His
 65 70 75 80
 Trp Val Gly Met Leu Thr Val Thr Pro Ala Asp Asp Gly Ser Leu Thr
 85 90 95
 Ala Glu Ser Leu Val Ser Ile Val Ala Val Ala Gln Gly Gly Pro Ala
 100 105 110
 Arg Leu His Leu Val Cys Thr Cys Arg Asp Val Leu Val Arg Glu Gly
 115 120 125
 Gly Arg Leu Leu Val Arg Glu Arg Val Val Thr Arg Asp Asp Arg Pro
 130 135 140

<210> 10

<211> 259

<212> PRT

<213> Streptomyces galilaeus

<400> 10

Val Arg Ile Ile Asp Leu Ser Ser Pro Val Asp Ala Ala Gly Phe Glu
 1 5 10 15
 Pro Asp Pro Val Val His Asp Val Leu Gly Pro Lys Glu Ala Ala Thr
 20 25 30
 His Met Ser Glu Glu Met Arg Glu His Phe Gly Ile Asp Phe Asp Pro
 35 40 45
 Ala Glu Leu Pro Glu Gly Glu Phe Leu Ser Leu Asp Arg Leu Gln Leu
 50 55 60
 Thr Thr His Thr Gly Thr His Val Asp Ala Pro Ser His Tyr Gly Thr
 65 70 75 80
 Arg Ala Ala Tyr Arg Asp Gly Pro Pro Arg His Ile Asp Glu Met Pro
 85 90 95
 Leu Asp Trp Phe Phe Arg Pro Ala Val Val Leu Asp Leu Ser Asp Gln
 100 105 110
 Gly Thr Gly Ala Val Gly Ala Asp Val Leu Arg Arg Glu Met Asp Arg
 115 120 125
 Ile Gly His Thr Pro Ser Pro Met Asp Ile Val Leu Leu Arg Thr Gly
 130 135 140
 Ala Asp Ala Trp Ala Gly Thr Pro Lys Tyr Phe Thr Asp Phe Thr Gly
 145 150 155 160

Leu Asp Gly Ser Ala Val His Leu Leu Leu Asp Leu Gly Val Arg Val
 165 170 175
 Ile Gly Thr Asp Ala Phe Ser Leu Asp Ala Pro Phe Gly Asp Ile Ile
 180 185 190
 Thr Arg Tyr Arg Ala Thr Gly Asp Pro Ser Val Leu Trp Pro Ala His
 195 200 205
 Val Ile Gly Arg Asp Arg Glu Tyr Cys Gln Val Glu Arg Leu Ala Gly
 210 215 220
 Leu Asp Arg Leu Pro Ala Ala His Gly Phe Arg Val Ala Cys Phe Pro
 225 230 235 240
 Val Arg Ile Ala Gly Ala Gly Ala Gly Trp Thr Arg Ala Val Ala Leu
 245 250 255
 Val Asp Glu

<210> 11

<211> 238

<212> PRT

<213> Streptomyces galilaeus

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 Glu Thr Leu Asp Asp Met Arg Ala Ala Val Arg Ser Met Ala Ala His
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Arg Thr Ile Ala Arg Ile Ser His Thr Thr Arg Lys Gly Arg Ala Thr
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Arg Met Glu Val Arg Phe Thr Val Gly Asp Ala Ala Gly Ile Gln Gln
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Phe Thr Glu Ile Asp Val Leu Thr Leu Phe Thr Arg Asp Glu Tyr Thr
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<212> PRT

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Ile Leu Leu Ile Cys Thr Glu Arg Asp Leu Glu Gln Phe Arg Arg Leu
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Leu Gly Asp Gly Ser Gln Leu Gly Leu Arg Ile Asp Tyr Ala Val Gln
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Asn Arg Pro Ala Gly Leu Ala Asp Ala Phe Val Ile Gly Ala Asp His
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Val Gly Asp Asp Asp Val Ala Leu Val Leu Gly Asp Asn Ile Phe His
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Gly His His Phe Tyr Asp Leu Leu Gln Ser Asn Val His Asp Val Gln
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Gly Cys Val Leu Phe Gly Tyr Pro Val Glu Asp Pro Glu Arg Tyr Gly
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Val Gly Glu Thr Asp Ala Ser Gly Gln Leu Val Ser Leu Glu Glu Lys
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Pro Leu Arg Pro Arg Ser Asp Leu Ala Ile Thr Gly Leu Tyr Leu Tyr
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Asp Asn Glu Val Val Asp Ile Ala Lys Asn Leu Arg Pro Ser Pro Arg
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<212> PRT

<213> Streptomyces galilaeus

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Ala His Gly Ala Arg Arg Ala Gly Arg Leu Ala Gly Thr Thr Gly Asp
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Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly
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Asp Gly Gly Ala Val Val Thr Ser Arg Asp Asp Thr His Arg Ala Leu
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Thr Pro Gly His Asn Ala Arg Leu Asp Glu Val Gln Ala Glu Ile Leu
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Arg Arg Lys Leu Arg Arg Leu Asp Thr Tyr Ile Glu Gly Arg Arg Ala
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Val Ala Arg Arg Tyr Glu Asp Gly Leu Gly Asp Thr Gly Leu Val Leu
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Pro His Thr Val Pro Gly Asn Glu His Val Tyr Tyr Val Tyr Thr Val
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Arg His Pro Arg Arg Asp Asp Ile Ile Lys Ala Leu Lys Ala Tyr Asp
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<223> Description of Artificial Sequence: degenerated oligonucleotide
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